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Let us remember upon the culmination of the second somnambulistic state we have a *new* subject in so far as volition goes. He is immobile, deaf, dumb and blind as the type quoted above. From the hypnotizer he must receive the impulse to talk, to tell his story, as would any new subject. He will *volunteer* nothing in word or act. Consequently we recognize he will not repeat the desired story, his waking story. Indeed, he will but sit passive, waiting the impulse his own mind cannot supply. Suggestion must now be given him by the experts to draw out his story, which may convict or acquit him. His whole mind will respond to that suggestion with the utter concentration I have above attempted to describe. This suggestion will govern and rule his thought, his speech, his story. If the suggestion from the experts bid him repeat the story of the crime, he will obey ; if it bid him deny the deed, he will do so vehemently ; if, in the progress of his denial, a new and contradictory suggestion is given, he will accept it and heartily accuse himself.

H. MERRIMAN STEELE.

THE CONDITIONS OF GOLD PRODUCTION.

In the January number of the REVIEW the Director of the Mint indulges in a characteristic commentary upon the statistics of gold production. Mr. Preston does not seem to possess an accurate knowledge of the conditions under which the figures, of which he writes, are created.

The matter is an important one, and though the writer may not be competent to take part in the public discussion of economic theories, yet as a mining engineer he asks to be permitted to correct certain ill-founded conceptions concerning one of the main factors determining the solution of the great monetary problem of our day.

The Director of the Mint takes pains to controvert Prof. Edouard Suess, and goes so far as to state that not one of the eminent Austrian's conclusions has been fulfilled. He denies that the increased production of gold goes hand in hand with geographical discovery. All the chequered history of gold mining proves Mr. Preston to be wrong. Is not the output of South Africa to-day the consequence of the geographical discoveries of yesterday ? Did not the development of the mineral resources of the Dark Continent come as the result of its exploration by the bands of travellers who followed in the footsteps of Livingstone and Stanley ? Has not the penetration of the deserts of Western Australia given us Coolgardie and Cue ? And, coming nearer home, is not the largest production of Colorado's increasing annual yield derived from the youngest of its many gold mining districts ? In direct opposition to Mr. Preston I would corroborate Professor Suess, and maintain that the newness of a gold mining district is usually synonymous with productiveness and that exhaustion accompanies age. Remember that Europe was once the great gold-producing region of the world; that Dacia was a golden storehouse to the Roman, and that at an earlier period Hannibal got the sinews of war out of the gold mines of Spain. Where are they now ? The former contributes a driblet, the latter are a tale in history.

The Director of the Mint, in contradiction to Professor Suess, submits that in South Africa it has been demonstrated that the gold contents of the ore increase with depth. To a mining engineer, experienced in gold mining and conversant with its vicissitudes, this is a surprising statement. The theory that lodes become richer in depth is a vain imagination of the visionary company promoter, which has long ago been discredited by geological science and mining experience. If it were so, why would people waste their energies in surface workings, why would they not sink shafts at least 4,000 feet deep and work upward? Such a proceeding would indicate both a logical sense and a proper knowledge of the best mining methods. The yield per ton of the ores* of the Witwatersrandt, the chief gold producing area of South Africa, has been as follows during the past seven years: In 1888, 22.65 dwts. per ton; in 1889, 19.60 dwts.; in 1890, 13.36 dwts.; in 1891, 11.23 dwts.; in 1892, 10.20 dwts.; in 1893, 10.09 dwts.; in 1894, 9.86 dwts.

The steady decrease in the yield is due to the gradual exhaustion of the bodies of higher-grade free milling ores occurring near the surface.

The Director's quotation of estimates of the millions of ounces of gold supposed to exist in the "banket" deposits of the Witwatersrandt reminds one of similar estimates made in the 'fifties when every Californian river bed was fondly imagined to be paved with gold and every Australian stream was a probable Pactolus. We have read this sort of thing long ago. It may be magnificent, but it is not statistics.

As a general rule in gold mining the free milling ores near the surface, which readily yield their values through simple processes of extraction, are succeeded by material of greater chemical complexity necessitating more elaborate and more costly methods of reduction. Mr. Preston appears to be aware that the ore of the deeper workings of the Witwatersrandt is pyrites-bearing, and must therefore be subjected to chlorination or some other leaching process, but he overlooks or fails to realize that to get the gold out of pyritic ore by chlorination or cyanidation is many times more expensive than to extract it out of free milling ores by amalgamation. That "only five per cent. of the gold is lost," that "it has become possible to obtain almost the last traces of the gold in the tailings," are statements of marked inaccuracy. The "tailings" are the residues of the ore after it has undergone amalgamation. On the Randt the acknowledged loss in the treatment of the tailings by the cyanide process is from twenty-five to thirty per cent. of the gold. Taking the ore as it goes to the mill it is fair to estimate that the total extraction (by amalgamation in the first place, by chlorination of the concentrates, and by the subsequent cyanidation of the tailings) reaches about eighty to eighty-five per cent. in the best establishments and is less in others.

In his estimate of the addition to be made to the world's gold production by the resumption of hydraulic mining in California under the terms of the Caminetti Act, the Director of the Mint echoes the optimism of the daily press of the Sierra Nevada. It is two years since the Act went into effect. What has been the result so far?

My experience of Californian mining permits me to venture to disagree with Mr. Preston, as my familiarity with the goldfields of Victoria enables me to contradict his statement that the "deep leads," or subterranean channels of golden alluvium, are far from being exhausted, and have as yet only been operated to a limited extent. The principal mines of this class at Creswick and Ballarat are some of them exhausted, and others approaching exhaustion. No new ones of equal productiveness are being found.

The Director then proceeds to state that numerous mines in Australia have been abandoned as soon as the unoxidized, pyritic ores were reached by downward development. This is imaginary. The causes of such abandonment are to be found elsewhere. The colonial metallurgists are as well acquainted as their American brethren with the use of processes rendering available the gold in the pyrite, if the gold be present in workable quantity. It is, indeed, a fact that the bulk of the gold product of Australia comes from free milling ores of marked simplicity, but where the pyrite does contain such value as to make it worth the saving, it is collected and sent to chlorination or other reduction works.

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* From the mill and from concentrates, not including the yield from old heaps of tailings.

This touches on a common fallacy floating in the public mind. There is an idea prevalent that technical science is rapidly bringing processes of gold extraction to such perfection that almost the ultimate portion of value can be obtained by methods as rapid as they are ingenious. The suggestion is frequently made by writers in the press that a mining district, a chamber of commerce, a state or even a national government, should offer a large reward for the discovery of a new process suitable to the simple treatment of complex ores. It is hoped that some heaven-sent revelation will be vouchsafed to some dreaming metallurgist which shall revolutionize all preexisting methods and get 100 per cent. of the value contained in the poorest and most perverse of gold-bearing material. Such ideas, such dreams, such hopes, are all opposed to experience and contradictory to the teaching of the pages which tell the progress of metallurgical art. Evolution, and not revolution, is the keynote of technical science as it is the clue to physiological development. Processes are born every day, but their mortality is depressing. The examination of the history of the standard methods of ore reduction indicates very clearly that it is in the gradual improvement and extension of established processes and in their adaptation to varying conditions that there will be found the readiest and safest road to excellence of metallurgical treatment. The cyanide process, for instance, has been the subject of chemical investigation and practical application for six years, and it is yet an imperfectly understood and only a partially successful method. Chlorination was introduced into California in 1856, it has undergone gradual improvement during forty years, but it is still spoken of as a young method of ore reduction.

"The fact is that the production of gold was never so rapid as it is to-day," the Director says. But this does not accord with statistics. In 1851 California produced gold of the value of $81,000,000 and in 1853 the colony of Victoria yielded over $62,000,000. To-day California and Victoria produce an approximately equal amount, viz.: about $13,000,000. What modern goldfield can the Director mention which can compare with those of the early 'fifties in the amount of their yield or in the ease with which that yield was obtained? South Africa certainly cannot. It is too little realized that the shallow alluvium which represents the easily skimmed cream of gold mining is being rapidly exhausted, and that the yield of the years that are coming will be won with much greater difficulty out of the hard rock by vein mining. Thus, for instance, the Witwatersrandt region in South Africa last year produced about $34,000,000 after seven years of the most vigorous and intelligent development, California yielded $81,000,000 three years after the first discovery in 1848 and Victoria contributed $62,000,000 after barely two years of work. It cost much less to obtain those combined 81 and 62, or 143 millions, in gold than it did to win the 'Randt's thirty-four millions.

In the golden age of Australian and Californian productiveness, 87 per cent. of the entire yield of the world's mining regions came from shallow gravel easily and rapidly mined, with the investment of very little more than muscle and energy; to-day 67 per cent. comes from the deep workings of vein mining, torn with difficulty from the heart of the rocks, with the investment of enormous sums of money in plant and machinery.

When the statistics of gold production are interpreted as a refutation of the idea that gold for monetary purposes may become scarce, then the mining engineer, saturated with the brutal facts of gold mining and familiar with the conditions under which those statistics are created, may venture to warn the community against the conclusion that a few figures are all that is necessary to an appreciation of the future of gold.

T. A. RICKARD.

A WORD ABOUT THE "NEW PULPIT."

THE recent article of the Rev. H. R. Haweis, on what he calls the "New Pulpit," is bright and entertaining, and contains many suggestive and helpful thoughts. But it is chiefly remarkable for the odd idea the writer has of the work and office of the Christian preacher.

In the March number of the REVIEW, the Rev. Bishop Foss, of the Methodist Episcopal Church, furnishes a paper "in the nature of a commentary" on the article by Mr. Haweis. But he, singularly enough, fails to note the remarkable standpoint of the writer of "The New Pulpit."

According to Mr. Haweis, the preacher should be a sort of Solomon in the encyclopedic character of his utterances. In this respect Solomon certainly was the prince of preachers. "He spake," we are told, "three thousand proverbs: and his songs were a thousand and five. And he spake of trees, from the cedar that is in Lebanon even unto the hyssop that springeth out of the wall: he spake also of beasts, and of fowl, and of creeping things, and of fishes."

Solomon is not named, it is true. We are, in fact, pointed to Christ, who is proclaimed *par excellence* The Preacher. But He is so on the lines of the preaching of Solomon. His themes, we are told, were:

> "The relations between a clever swindler and his employer, a woman plying her broom diligently, a clamorous widow worrying a police magistrate, the children in the street playing their vulgar little games and singing their vulgar little songs, the processes of digestion, the weather (that inexhaustible and invariably interesting topic), the occupations of Hodge, the secrets of fishing, the art of making bread or bottling wine—these were the topics of the Divine Preacher."

This is all a mistake. These were not the topics of His sermons at all. These were but the illustrations He used. He had not three thousand subjects, but one subject; not a thousand and five sermons, but one sermon. He preached the Kingdom and the Kingdom only.

It is fortunate for the clergy—it is perhaps even more fortunate for their hearers—that Christ, and not Solomon, is their exemplar here. The man does not live who can talk profitably on all the widely differing interests of men. The attempt to do so would only end in dismal failure. But the preacher who would reach men, having, like his Master, but one subject and that the Kingdom of God, must also, like his Master, widely gather his illustrations for that one subject and use them unsparingly. As the sky above is ever one and yet ever varying, changing from day to day, so must the message from the Christian pulpit be. Its one subject, first and last and all the time, is